3D Graphics Standards 2008

3D Graphics

Grade Levels: 11-12
Units of Credit: .5
CIP Code: 11.0215
Prerequisites: Computer Technology and Multimedia I: Design and Development or Teacher Approval
Skill Certification Exam: #818

Course Description

3D Graphics is a one **semester** course. Students will use 3D graphics software to produce 3D models. This course will introduce students to 2D and 3D modeling, the creation and application of textures, mapping, lighting, camera techniques, and rendering of 3D models.

Course Standards and Objectives

Standard 01 Students will identify the applications of 3D graphics and animation through exploring the career opportunities and the relevant history of the industry.

Objectives

0101 Identify various applications of 3D graphics and animation, such as:

- Entertainment
- Health Sciences
- Architecture and Engineering
- Aerospace
- Advertising
- Graphic Design and Illustration

0102 Develop career awareness related to working in the 3D graphics and animation industry.

- Identify personal interests and abilities related to 3D Graphics careers
  - Identify personal creative talents
  - Identify organizational and leadership skills
  - Identify special interest areas
- Identify 3D graphics and animation job titles, such as:
  - Animator
  - Industrial Designer
  - 3D Modeler
  - Technical Director
- Investigate career opportunities, trends, and requirements related to 3D graphics and animation careers
  - Identify the members of a 3D graphics and animation team:
  - Investigate trends associated with 3D graphics and animation careers
  - Develop a realistic Student Education Occupation Plan (SEOP) to help guide further educational pursuits

- Identify factors for employability and advancement in 3D careers
  - Survey existing 3D graphics and animation businesses to determine what training is required
  - Survey universities and colleges to determine programs, degrees and training availability
  - Develop employability competencies/characteristics: responsibility, dependability, ethics, respect, and cooperation
  - Achieve high standards of personal performance with a positive work ethic and attitude

0103 Discuss the relevant history of the 3D graphics & animation industry. (See PowerPoint)

- Early 2D animations on film
- Key mile markers in animation
- Key figures and animators in animation history

Standard 02 Students will create a basic 3D model as an introduction to the 3D development process.

Objectives

0201 Introduce basic 3D terminology and the 3D application interface.

0202 Create a 3D model. (Include modeling, surface materials, camera, lighting, moving, scaling, and rendering)

0203 Create an environment/background.

Standard 03 Students will model 3D objects.

Objectives

0301 Introduce pertinent terminology.

0302 Use and manipulate 3D graphics and Primitives.

0303 Create, use and manipulate shapes.

0304 Edit models.

- Extrusion
- Boolean
- Beveling
- Lathe/Revolve
- Grouping
- Model Hierarchy (parent/child)
- Reshape/Convert
- Duplication/Mirroring
- Pivot/Origin Points
- Making a surface from Curves (lofting/skinning)
- Subdivision
- Modifying: edges, faces, vertices
- Use a reference graphic/image/drawing (background)
- Edit an object after its been created (history)
- Other software specific tools

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Standard 04 Students will apply surface materials to 3D models.

Objectives

0401 Introduce pertinent terminology.

0402 Create, Apply and edit surface materials.

- Color
- Texture
- Procedurals
- Luminosity
- Transparency
- Reflective
- UV Mapping

Standard 05 Students will apply lighting and camera techniques to achieve intended effects.

Objectives

0501 Introduce pertinent terminology.

0502 Apply lighting effects.

- Basic three point lighting for artistic effect: key, fill, rim
- Other realistic lighting: indoor, outdoor, mood, artistic, etc.
- 3D specific lighting sources
  - Global/Image Based
  - Directional
  - Spot Lights
  - Shadows/Shading
  - Point Light

0503 Apply camera effects.

- Aspect Ratio/Film Back
- Setting and modifying camera views
  - Staging and Manipulating
  - Truck
  - Pan
  - Zoom
  - Dolly

Standard 06 *Students will animate 3D models. (Covered in 3D Animation.)*

Standard 07 Students will render 3D models.

Objectives

0701 Introduce pertinent terminology.

0702 Introduce and apply the mechanics of rendering.

- Raytracing
- Shadows/Lighting
- Output
  - File Types
  - Resolution
  - Destinations
  - Naming Conventions